John Corum

Dr. Sherwood

ENGL 871

1 July, 2017

**“They Need Attention to Survive:”**

**The Problem of Obsolesce in Electronic Literature**

Most scholarly or literary works, when published and printed using traditional means, can be reasonably assumed to have near indefinite accessibility. That is, as long as a library in some corner of the world saves a single copy, it is possible for readers to consume the information inside. However, the issue of continued accessibility to a given work becomes immensely more complex when that work is born in a digital environment. That is, literary pieces that depend on computer interfaces to convey their full effect necessarily depend on the continued availability of those computer interfaces. And as digital standards and conventions are continuously updated and replaced, so too are electronic productions rendered vulnerable to becoming forgotten digital detritus, posing what Bucknell University Museum fellow Laura Libert refers to as “the omnipresent problem of obsolescence” (2). Given the creative and cultural significance of digital works as well as their inherent existential limitations, how might we approach the preservation of such productions? I contend that while adherence to digital standards and collaboration with specialists during the production stages of digital works may better prepare them for later preservation, that ultimately, effective systemic archival will require the generous allocation of resources to the relevant departments.

Of course, the pressing need for new, specialized preservation techniques is a (relatively) recent development. After all, our existing archival mechanisms have been (mostly) sufficient for printed literary works. As Katherine Hayles notes, these mechanisms include such elements as “libraries and librarians, conservators, and preservationists” (39).

Unfortunately, she laments, these mechanisms are unable to account for the “fluid nature of digital media; whereas books printed on good quality paper can endure for centuries, electronic literature routinely becomes unplayable (and hence unreadable) after a decade or even less” (Hayles 39).

An example of this troubling ephemerality is a digital production concerning the Civil War called *Valley of the Shadow.* This project, which began development in the early nineties, was developed by Edward Ayers, a then-historian (though he is now president of the University of Richmond). This production was an interactive experience of historical events that also featured an impressive digitization of many primary-source documents from the era (documents which were painstakingly selected from both the northern and southern sects). Readers can delve into a re-imagination of rural Virginia, for example, explore the area and look through newspaper articles. The same experience is possible for urban Pennsylvania.

The literary nature of the production, however, is distinctly accented by the implementation of personal letters and diaries, which personalize the reader experience. This allows the imagination of the reader to not just experience the historical narrative, but to interpret it subjectively as well. The project took many years and a great sum of money to produce, and was finally compiled for W.W. Norton using the CD-ROM format. The issue, Ayers recounts, is that this was completed “just in time for nobody to use CD-ROMs anymore” (qtd. in Howard). Before the project was even distributed widely, it was outmoded.

The fate of Ayers’ project, just like so many contemporary computer literary productions, is subject to the ever-changing whims of digital convention. Riccardo Ferrante of the Smithsonian Institution Archives expresses great concern at this issue. He goes so far as to state that without an increase of attention to the already widening gap in the historical record, we face “an impending dark age” in which the loss of digital masterpieces becomes the norm (Elkin and Norris).

What might be the direct causes of such a dark age? The Council on Library and Information Resources (CLIR) contends that the various contributions to the obsolescence can be divided into two main categories: those concerning the physical condition of the digital pieces and those concerning the digital condition (15-16). Physical condition refers to the condition of the physical drives upon which digital productions reside (these degrade quickly over time). The digital condition refers to the coded authenticity of the products (code can become corrupted easily). This category also includes the “condition” of the viewing platform’s relevance and accessibility (that is, whether or not the piece can be effectively run on modern hardware).

Initially, the hardware components of the digital medium tend to degrade over time, even in storage—and this happens much faster than one would realize. As the CLIR continues, digital media is, in some ways, just as (if not more) vulnerable to physical destruction as its printed counterpart: “It is crucial that media is well protected from moisture, extreme temperatures, strong electromagnetic fields, and rough handling when being transferred to a repository,” as all of these conditions could damage (or destroy) the involved project (12-13). Physical threats are not as pressing of a problem concerning pieces created after the widespread use of internet storage, but they are nonetheless relevant to literary archival. For this reason, merely stockpiling old hardware for the viewing of archaic projects is not a long-term solution to the problem of obsolescence.

In addition to these effects, the digital condition of electronic literary pieces must be carefully considered. In some cases, this condition is threatened by seemingly no external stimulus at all. In other words, the digital code constituting a piece may be corrupted not by a user, but by interaction from other processes running on the viewing platform. In fact, “even turning on a computer can alter files, and opening files in applications can change date and time stamps, possibly affecting the monetary and cultural value of the materials” (CLIR 3). Attempts to access the file almost always alter at least small portions of the project’s code, greatly complicating attempts at preserving the functionality and legitimacy of older pieces (CLIR 4).

However, the single biggest issue facing the digital condition aspect of a work is the availability of the needed viewing platform elements. That is, as we continuously replace our technological standards with radically different iterations of the digital, it becomes increasingly difficult to access programs that rely on outdated computers or systems. As Hayles elaborates, “Commercial programs can become obsolete or migrate to new versions incompatible with older ones, and new operating systems (or altogether new machines) can appear on which older works will not play” (39-40). Programs written for the DOS system have almost no chance of running cleanly on modern systems (even emulating them is becoming more difficult); pieces stored on five inch floppy disks quite literally have no place in the modern machine. Ayer’s *Valley of the Shadow,* created to be run from a CD-ROM, faces real problems in a world in which computers no longer have CD-ROM drives.

Unfortunately, *Valley of the Shadow* isn’t the only piece that has suffered from this onward march of computing evolution. Another example is *Io Sono At Swoons*, a digital media poem created by Loss Pequeño Glazier in 2002 that generates somewhat random strings of multilingual text every forty seconds. This, Glazier explains, serves to both combine lexical fragments across multiple cultures as well as to create a challenging script for oral performance (211).

However, as the piece was created using conventions that were becoming outdated even in 2002 (it was written on a pre-Windows XP machine), it quickly became more difficult to access and experience. Indeed, it is now almost impossible to find, and the only readily available version is a video recording of the program running on its native machine. Though such recordings offer readers a glimpse into what the project may have been like in its full splendor, they fall short of fostering an experience comparable to that which was possible in the piece's heyday.

Even more recent pieces, however, are becoming more challenging to access. This is especially true of pieces reliant on Flash software for their presentation (and a great number of works created in the late 90’s and the early 2000’s are guilty of this). *Brainstrips*, for example, a piece by Alan Bigelow created in 2008, uses Flash technology to satirize and undermine the dominant assumptions of philosophy, math, and science. However, it depends on the reader's ability to *use* Flash technology, which becomes less and less likely as developers quickly move away from the system of coding and compiling that peaked at the turn of the century. Many modern browsers (especially those associated with Apple devices) don't even have the option to view Flash-based web pages.

Bigelow, like a great number of digital poets of his time, relied on the convention of Flash to develop his project, unaware at the time of its shelf-life. And indeed, at the time, it seemed not to have one. As Keith Collins explains, "Adobe Flash was the future." Easily recognizable for its vector-based graphics and quirky hyperlinks, Flash quickly dominated modes of digital piece production. Unfortunately, this trend would not last, as more and more developers began to realize the serious downsides to the technology. It was extremely resource intensive, and it relied on proprietary software monopolized by a single company (Adobe). Its fate was sealed in 2007 when Apple announced it would no longer support Flash programs in their next generation of Apple devices (Collins). "Adobe Flash was the future," Collins finishes starkly, "until it wasn't."

This inevitable ephemerality of the new media production is the downside of the mode’s innovative capabilities. That is, digital literature offers exciting new ways for readers to experience and interact with their texts, but it comes at a cost. As Shae Killey summarizes, “Constant technological innovation has allowed for digital poets to be more creative in how they construct their work, but…this same innovation is also its biggest hurdle,” as changes in the standards of code and software often make these older works obsolete and inaccessible. How, then, might the humanities approach this problem of obsolescence?

Bradley J. Daigle, director of digital curation services at the University of Virginia Library, suggests that special considerations be taken in the beginning stages of the writing process (qtd. in Howard). “Think about the life cycle of preservation,” he continues, “The more you do that, the longer it’s going to be around, and that time is well spent” (qtd. in Howard). Daigle suggests that consulting digital librarians to ensure that works are created using the most up-to-date standards possible is an effective way to maximize the lifespan of a project (qtd. in Howard). Hayles supports this notion, arguing that “standardization of protocols has also allowed the rapid and virtually seamless integration of data ﬂows from computers all over the world,” meaning that meeting current standards encourages widespread accessibility and longevity of the works (93).

What might these standards include? Hayles elaborates on this topic, explaining that good digital writing habits include “preferring open systems to closed systems, choosing community-directed systems over corporate-driven systems, adhering to good programming practices by supplying comments and consolidating code, and preferring plain-text to binary formats and crossplatform options to single-system options” (41).

In other words, corporations (Adobe is a very apt example) rarely produce coding infrastructures that ensure continuing viability of projects (while this is more common in open source, community-developed infrastructures). Similarly, plain-text formats will always be readable by humans, whereas binary formats will lose their readability over time. “These commonsense recommendations make available to writers and authors issues they can consider at the beginning of projects, before substantial time and resources are invested in options that may prove damaging to long-term preservation and costly to change, once the work has been implemented” (Hayles 41).

Even aligning to the current digital conventions, however, does not guarantee immortality for a new media production. Regardless of the supposed everlasting potential of a particular digital coding protocol, eventually, conventions will change and older projects will be relegated to the digital past. For this reason, the challenge of archiving and preserving new media projects will eventually face every one of these productions. The University of Virginia Library has created a digital curation program to better experiment with and improve these processes.

As Howard elaborates, Virginia approaches the enormous backlog of digital productions slated for preservation by dividing the projects into two categories: those that will be recorded, and those that will be rebuilt. Recording a project usually includes simply creating a “snapshot” (usually a screen recording) of the piece, start to finish (Howard). Rebuilding the project is far more complicated and includes systematically updating and replacing the core components of the piece to bring it up to alignment with modern digital standards. Because rebuilding a project is very time and resource intensive, many projects of lesser notoriety are deemed deserving only of recording (Howard).

Recording a digital media production is straightforward and usually requires only that the piece function properly one time, after which point a video of the piece replaces the original version. Because video files are simple enough to be easily converted or updated to accommodate changes in file format standards (though video formats have remained relatively static over time), these recordings require very little effort to be preserved (after the initial recording process, that is).

This ease of recording, however, comes at a significant trade-off. In many cases, digital media productions include reader interactivity such as buttons and links that advance the story (and in some works, even determine the shape of the story). In other cases, these works change and update according to pre-coded algorithms (words might randomly change) or continuously updated internet databases (words might be pulled from websites that are updated in real time). Recordings of these types of productions may give readers a good idea of what the original project was like, but they fail to fully convey the fluid experience of these dynamic works by producing content in real time. Furthermore, the recordings are the same at every viewing, whereas these types of pieces might rarely (if ever) produce the same text twice. The aforementioned *Io Sono At Swoons* was preserved online in this way, though it can no longer produce new text outputs.

The other method of preservation is that of rebuilding. This goes beyond merely emulating old software and hardware to generate a somewhat workable creation of an old project; it involves decompiling the project down to its most basic components and then rebuilding it to function within the infrastructure of a modern digital framework. This was the way in which *Valley of the Shadow* was preserved. As Daigle elaborates, the process was not unlike what mechanics used to do in the fifties: “We basically swapped out all the parts and rebuilt the engine.” His team then collected all the individual files (of which there were several hundred thousand), analyzed them to determine if they were in good condition and in modern file formats, and then rebuilt the program into a new, web-based interface (qtd. in Howard). Now, the public can experience *Valley of the Shadow* for the foreseeable future, and automated monitoring software ensures that the site continues to run smoothly (and alerts the digital curators when a digital tune-up is needed).

Of course, while this reproduction was a success, it nonetheless highlights several issues with the process of rebuilding. Namely, it is extremely time and resource intensive. Rebuilding *Valley of the Shadow* took two years, three full-time employees, and over one hundred thousand dollars (Howard). The University of Virginia could shoulder such a financial burden, but the sad truth is that the vast majority of Universities cannot. And, even if such a one-time investment were possible, matching that commitment with every digital work needing preservation is simply impossible. For this reason, Virginia chooses to make snapshots of most of the digital works in its charge. It is simpler, it is easier, it is cheaper, and it is the only possible way to catalogue at least some form of our digital history. As Daigle summarizes stoically: “you can’t save everything” (qtd. in Howard).

While it is clear that the rebuilding form of preservation is by far preferable, either rebuilding or recording is preferable to no attempt at archival. And unfortunately, many digital works are still at risk of fading into obscurity because they do not stand to be catalogued in some way. The University of Virginia Library receives submissions of both old and new digital projects to preserve, both from the faculty and the public, but many projects have already been forgotten and are at risk of fading into obscurity. Before these projects can be archived, they must be found; they must be noticed. As digital curation services at Virginia summarizes of digital stewardship: “It’s an essential but easily overlooked element in any digital-humanities project. Born-digital work can die. Digital stewardship ‘involves care and feeding’ to make sure that doesn’t happen” (Howard). Only by delivering this stewardship can we better ensure the lifespan of these works.

As the discussed projects show, methods of preservation and archival already exist for new media literary projects. However, the discussed projects also suggest pressing limitations of these methods. Namely, the most effective methods of preservation require a great amount of time and money—and these resources are generally not allocated to digital curation (and indeed, these programs rarely even exist). Before we can seriously consider the possibility of systematically cataloguing digital projects, we must first resolve this funding disparity by acknowledging the cultural significance of electronic literature: literature that, as Hayles argues, “risks being doomed to the realm of ephemera” (40).

In closing, electronic literature offers a plethora of new ways for readers to experience and immerse themselves in the texts they encounter; however, these possibilities include new and unforeseen obstacles that represent serious obstacles to ensuring the longevity of these pieces. As computer interfaces and digital conventions grow and advance rapidly over time, the literary productions they contain become vulnerable to losing accessibility, and thus, they become vulnerable to becoming totally lost to the public. The University of Virginia’s aggressive engagement with the problem of obsolescence demonstrates that long-term preservation is possible, but will need greater forethought in the production phases of future pieces. It will also require the generous allocation of funds and personnel to digital archival projects (as was the case with the University of Virginia’s Library), which are resource-intensive by nature. Only by exploring these options can we hope to record and preserve this digital portion of our cultural and literary development. Electronic literature deserves our attention; after all, it needs attention to survive.

**Works Cited**

Collins, Keith. “How Adobe Flash, once the face of the web, fell to the brink of obscurity—and

why it’s worth saving.” *Quartz Media,* 29 Dec. 2016.

Council on Library and Information Resources. *Born Digital: Guidance for Donors, Dealers,*

*and Archival Repositories.* CLIR Publications, 2013.

Elkin, Lisa and Christopher Norris. *Preventative Conservation: Collection Storage*. AIC

Publications, 2017.

Glazier, Loss Pequeño. “Io Sono At Swoons.” *New Media Poetics,* edited by Morris, Adalaide

and Thomas Swiss, MIT Press, 2006, pp. 211-216.

Hayles, Katherine. *Electronic Literature: New Horizons for the Literary.* University of Notre

Dame Press, 2008.

Howard, Jennifer. “Born Digital, Projects Need Attention to Survive.” *The Chronicle of Higher*

*Education,* 6 Jan. 2014.

Killey, Shae. “Digital Poet Jason Nelson Urges Others to Forge New Frontier in Electronic

Literature.” *ABC News,* 1 Jan. 2014.

Libert, Laura. “Conference Beat: Techfocus III: Caring for Software-Based Art.” *Buckness*

*Unviersity,* 5 Oct. 2015.